

### **REMARKS**

This communication is a full and timely response to the non-final Office Action dated October 27, 2003. By this communication, a drawing sheet containing Fig. 15 has been added, and the Brief Description of the Several Views of the Drawings in the specification has been amended to disclose that figure 15 is a cross-sectional view of a main-part, showing a second structural example of the magnetic layer in which a non-magnetic layer has a plurality of layers. Support for the amendment to the drawings and the Brief Description of the Several Views of the Drawings can be found in the specification at page 12, line 20 through page 13, line 3. Furthermore, claim 1 has been amended to recite, among other things, the non-magnetic metal ground layer is constructed by layering a plurality of layers, the plurality of layers having an Ru concentration of at least 20 at%, and includes other compositions containing Ru and an element other than Ru. Support for the amendment to claim 1 can be found variously throughout the specification. For example, support for the changes to claim 1 can be found in the specification at page 12, line 20 through page 13, line 3. Still further, claim 16 has been amended to depend from claim 1. No new matter has been added. Claims 1 and 3-16 are pending where claim 1 is independent.

#### **Drawing Amendments**

As noted above, Applicants have added a drawing sheet containing Fig. 15 to the application. New Fig. 15 illustrates a structural example of a magnetic recording medium when the non-magnetic ground layer is composed of a plurality of layers. Support for Fig. 15 can be found in the specification at page 12 line 20 through page 13, line 3. Applicants respectfully submit that no new matter has been added.

#### **Rejections Under 35 U.S.C. §112**

Claims 1 and 3-16 were rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. Applicant respectfully traverses this rejection.

The Office Action alleged that the claim 1 element reciting the non-magnetic metal ground layer is constructed by sequentially stacking a plurality of layers is not supported in the specification. While Applicant disagrees with this position, in an effort to expedite

prosecution, Applicant has amended claim 1 to recite, among other things, the non-magnetic metal ground layer is constructed by layering a plurality of layers. As noted above, support for this change can be found at page 12, line 20 through page 13, line 3 of the specification.

The Office Action further alleges that the specification fails to support having a ground layer made up of a plurality of layers where each of the stacked layers has an Ru concentration of at least 20at%.

As stated at page 12, lines 20-21 of the specification, for example, “the non-magnetic metal ground layer 2 may be made by layering a plurality of layers having **different compositions of Ru and an element other than Ru**.” Applicant notes that this phrase does not limit the composition of the layers of the non-magnetic metal ground layer 2 to any particular at% of Ru. In addition, at paragraph four the Office Action acknowledges that the specification supports a “ground layer comprising multiple layers wherein each layer contains ‘different’ amounts of Ru.” Based on at least this acknowledgement, if each layer of a multiple layered ground layer has different compositions of Ru **and** an element other than Ru, Applicant fails to understand how the Office Action concludes that the phrase “different compositions of Ru” does not include an Ru concentration of at least 20at%. Regarding the single-layer non-magnetic ground layer, the specification, for example, discloses:

1. “[A] non-magnetic ground layer [2] formed on the substrate 1 and containing Ru at a ratio of 20at% or more.”

*See page 8 lines 5-6.*

Regarding the multi-layered non-magnetic ground layer, the specification discloses, for example:

2. “[T]he non-magnetic metal ground layer 2 may be made by layering a plurality of layers having different compositions of Ru and an element other than Ru.”

*See page 12 lines 19-20.*

Therefore, an example of combining the non-magnetic ground layers cited in items 1 and 2 above, results in the structure as follows:

3. A non-magnetic metal ground layer 2 formed on the substrate 1 and made by layering a plurality of layers having different compositions of Ru at a ratio of 20 at% or more and an element other than Ru.

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As noted above, Applicant has amended the drawings to include a new Fig. 15 that illustrates the multilayer structure of the non-magnetic metal ground layer 2.

The Office Action alleges that the single layer ground layer of item 1 cannot be included in the multi-layer ground layer of item 2. However, as evidenced by the discussion above, when claim 1 is given a broad reasonable interpretation in light of Applicant's specification, the position of the Office Action has no merit. *See* MPEP §2163 (8<sup>th</sup> ed. Rev. 1, 2003).

Therefore, for at least the reasons stated above and the acknowledgement by the Office Action of differing amounts of Ru in the plurality of layers in the multilayer ground layer, at a minimum, in each layer the Ru concentration is within a range from 0 at% to 100 at%, e.g.  $0\text{at}\% < \text{Ru} < 100\text{at}\%$ . Accordingly, Applicant respectfully requests that the rejection of claims 1 and 3-16 under §112, first paragraph should be withdrawn.

Claim 16 was rejected under 35 U.S.C. §112, second paragraph as indefinite. Applicants respectfully traverse this rejection.

As noted above, claim 16 has been amended to depend from claim 1. In clarifying the language of claim 16, Applicants point to the use of the alternative term "or" in line 4. Claim 16 recites, among other things, the separation layer includes Ru singly or an Ru alloy and at least one kind of material. Based on the claim structure, and in particular, the absence of any punctuation marks within this phrase, e.g. comma or semicolon, it should be apparent that Ru singly means Ru being the only component. For example, if in the claim a comma were placed after the term alloy (*Ru singly or an Ru alloy, and*) then the separation layer could be read to include Ru singly and at least one other kind of material. However, as the claim is presently recited, the separation layer may include Ru singly and in the alternative an Ru alloy and at least one other kind of material.

In addition, the phrases defining the elements from which the first group and the second group can be selected are separated by "and." Therefore, the first group and the second group are both included in a separation layer made up of an Ru alloy.

For at least these reasons, claim 16 is definite and distinctly claims the subject matter of the instant invention. Accordingly, Applicant respectfully requests that the rejection of claim 16 under §112, second paragraph be withdrawn.

**Rejections Under 35 U.S.C. §103**

As a preliminary matter, Applicant notes that because of the alleged inclusion of new matter in the claims the Examiner has essentially repeated the previous rejections and has refused to acknowledge Applicant's previous arguments. As Applicant maintains that there is no prohibited matter, all previous arguments are repeated below. Applicant also notes that because the Examiner has failed to rebut each of Applicant's arguments, all previous §103 rejections are effectively withdrawn. *See* MPEP §707.07(f) (8<sup>th</sup> ed, Rev. 1 2003) which states in summary, if Applicant's arguments are not questioned by the Examiner, the Applicant's arguments are accepted at face value.

Claims 1, 4, 5, 12, 15, and 16 were rejected under 35 U.S.C. §103(a) as unpatentable over *Futamoto et al.*, U.S. Patent No. 6,183,893 in view of *Futamoto et al.*, U.S. Patent No. 6,383,667. Applicants respectfully traverse this rejection.

Claim 1 recites a magnetic recording medium comprising a non-magnetic substrate; a non-magnetic metal ground layer formed on a main surface side of the non-magnetic substrate and containing an Ru concentration of at least 20 at%; and a magnetic layer formed on the non-magnetic metal ground layer and having a metal magnetic thin film, wherein the non-magnetic metal ground layer is constructed by layering a plurality of layers, the plurality of layers having an Ru concentration of at least 20 at%, and includes other compositions containing Ru and an element other than Ru.

*Futamoto '893* discloses a perpendicular magnetic recording medium and a magnetic storage apparatus for high-density magnetic recording. The perpendicular magnetic recording medium having a perpendicular magnetic film formed on a non-magnetic substrate 11 through underlayer 12 and 13. A second perpendicular magnetic film 14 is formed on the second underlayer 13, and an upper perpendicular magnetic layer 15 being formed on the second perpendicular magnetic film 14. A protective film is then formed on the upper perpendicular magnetic layer 15. The first underlayer contains Ti or Ru, or Ti or Ru as a main element and Cr, V, Mo or W as an additive element. The second underlayer 13 includes a nonmagnetic element such as Cr, V-Mo, W, Nb, Re, Ti or Y in an amount of 25at% or more and 50at% or less and Co. The Office Action acknowledges that *Futamoto '893* fails to disclose, teach, or suggest at least the non-magnetic metal ground layer is constructed by layering a plurality of layers, the plurality of layers having an Ru concentration of at least 20 at%, and includes other compositions containing Ru and an element other than Ru. Further,

Applicant adds that *Futamoto* '893 fails to disclose, teach, or suggest that the first underlayer has a concentration of Ru in an amount of at least 20at% or more.

*Futamoto* '667 discloses a magnetic recording medium including a non-magnetic substrate 11, an underlayer 12 provided on the substrate, a Co alloy magnetic film formed through the under layer 14, and a protective film for protecting the magnetic film 15. *See Abstract*. The underlayer 12 is a two layer structure, wherein a lower underlayer 12a is covered by an upper underlayer 12b. The upper underlayer 12b is covered by the Co alloy magnetic film 14, and can be a  $\text{Co—Ru}_x\text{—Cr}_y$  alloy, wherein the atomic concentration for  $x$  is  $5 \text{ atomic \%} < x \leq 65 \text{ atomic \%}$  and  $y$  is  $35 \text{ atomic \%} \geq y \geq 9 \text{ atomic \%}$ . *Futamoto* '667 further discloses a number of embodiments illustrating various layer structures of the magnetic recording medium (see Figs. 2-4 and 7-9), but fails to disclose that the first underlayer and any layer other than the second underlayer can contain Ru at a concentration of at least 20at% or more. Moreover, *Futamoto* '667, fails to disclose, teach, or suggest at least the non-magnetic metal ground layer is constructed by layering a plurality of layers, the plurality of layers having an Ru concentration of at least 20 at%, and includes other compositions containing Ru and an element other than Ru. In contrast, *Futamoto* '667 merely teaches that two layers, the first and second underlayers contain Ru or an Ru alloy. Still further, *Futamoto* '667 fails to disclose, teach, or suggest at least the first underlayer having an Ru concentration in an amount of at least 20at% or more.

In sum, *Futamoto* '893 and *Futamoto* '667 either singly or combined, fail to teach every element recited in claim 1. At best, the combination of these references will yield a magnetic recording medium having a nonmagnetic layer comprised of two layers. The first of these layers having either Ru or an Ru alloy (no concentration provided), and the second layer having Ru or a Co alloy, wherein the Co alloy is nonmagnetic when Ru is at a concentration of 34at% or more. The combined references fail to disclose, teach, or suggest that more than two underlayers of the above compositions can be used. Further, the applied combination fails to provide evidence that the combination would achieve the claimed results if more than two underlayers were provided. Thus, a *prima facie* case for obviousness has not been established.

To establish *prima facie* obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Moreover, obviousness "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or

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suggestion supporting the combination." ACS Hosp. Sys. V. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). For at least these reasons, Applicant respectfully requests that the rejection of claim 1 under 35 U.S.C. §103 be withdrawn and this claim be allowed.

Claims 5, 12, 15, and 16 depend from claim 1. By virtue of this dependency, Applicants submit that claims 5, 12, 15, and 16 are allowable for at least the same reasons given above with respect to claim 1. In addition, Applicants submit that claims 5, 12, 15, and 16 are further distinguished over *Futamoto '893* and *Futamoto '667* by the additional elements recited therein, and particularly with respect to each claimed combination. Applicants respectfully request, therefore, that the rejection of claims 5, 12, 15, and 16 under 35 U.S.C. §103 be withdrawn, and these claims be allowed.

Claim 3 was rejected under 35 U.S.C. §103(a) as unpatentable over *Futamoto '893* in view of *Futamoto '667* and further in view of *Lal et al.*, U.S. Patent No. 5,356,522. Applicant respectfully traverses this rejection.

Claim 3 depends from claim 1. By virtue of this dependency, Applicant submits that claim 3 is allowable for at least the same reasons given above with respect to claim 1. In addition, Applicant submits that claim 3 is further distinguished over *Futamoto '893*, *Futamoto '667*, and *Lal* by the additional elements recited therein, and particularly with respect to each claimed combination. Applicant respectfully requests, therefore, that the rejection of claim 3 under 35 U.S.C. §103 be withdrawn, and this claim be allowed.

Claim 6 was rejected under 35 U.S.C. §103(a) as unpatentable over *Futamoto '893* in view of *Futamoto '667* and further in view of *Shiroishi et al.*, U.S. Patent No. 4,833,020. Applicant respectfully traverses this rejection.

Claim 6 depends from claim 1. By virtue of this dependency, Applicant submits that claim 6 is allowable for at least the same reasons given above with respect to claim 1. In addition, Applicant submits that claim 6 is further distinguished over *Futamoto '893*, *Futamoto '667*, and *Shiroishi* by the additional elements recited therein, and particularly with respect to each claimed combination. Applicant respectfully requests, therefore, that the rejection of claim 6 under 35 U.S.C. §103 be withdrawn, and this claim be allowed.

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Claims 7, 8, and 13 were rejected under 35 U.S.C. §103(a) as unpatentable over *Futamoto '893* in view of *Futamoto '667* and further in view of *Suzuki et al.*, U.S. Patent No. 6,335,103. Applicant respectfully traverses this rejection.

Claims 7, 8, and 13 depend from claim 1. By virtue of this dependency, Applicants submit that claims 7, 8, and 13 are allowable for at least the same reasons given above with respect to claim 1. In addition, Applicant submits that claims 7, 8, and 13 are further distinguished over *Futamoto '893*, *Futamoto '667*, and *Suzuki* by the additional elements recited therein, and particularly with respect to each claimed combination. Applicant respectfully requests, therefore, that the rejection of claims 7, 8, and 13 under 35 U.S.C. §103 be withdrawn, and these claims be allowed.

Claims 9 and 10 were rejected under 35 U.S.C. §103(a) as unpatentable over *Futamoto '893* in view of *Futamoto '667* and further in view of *Wu et al.*, U.S. Patent No. 6,218,003. Applicant respectfully traverses this rejection.

Claims 9 and 10 depend from claim 1. By virtue of this dependency, Applicants submit that claims 9 and 10 are allowable for at least the same reasons given above with respect to claim 1. In addition, Applicant submits that claims 9 and 10 are further distinguished over *Futamoto '893*, *Futamoto '667*, and *Wu* by the additional elements recited therein, and particularly with respect to each claimed combination. Applicant respectfully requests, therefore, that the rejection of claims 9 and 10 under 35 U.S.C. §103 be withdrawn, and these claims be allowed.

Claim 11 was rejected under 35 U.S.C. §103(a) as unpatentable over *Futamoto '893* in view of *Futamoto '667* and further in view of *Honda et al.*, U.S. Patent No. 5,851,643. Applicant respectfully traverses this rejection.

Claim 11 depends from claim 1. By virtue of this dependency, Applicant submits that claim 6 is allowable for at least the same reasons given above with respect to claim 1. In addition, Applicant submits that claim 11 is further distinguished over *Futamoto '893*, *Futamoto '667*, and *Honda* by the additional elements recited therein, and particularly with respect to each claimed combination. Applicant respectfully requests, therefore, that the rejection of claim 11 under 35 U.S.C. §103 be withdrawn, and this claim be allowed.

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**Conclusion**

Based on at least the foregoing amendments and remarks, Applicants submit that claims 1 and 3-16 are allowable, and this application is in condition for allowance. Accordingly, Applicants request favorable reexamination and reconsideration of the application. In the event the Examiner has any comments or suggestions for placing the application in even better form, Applicants request that the Examiner contact the undersigned attorney at the number listed below.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 18-0013, under Order No. SON-2055 from which the undersigned is authorized to draw.

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Respectfully submitted,

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